# PATENT ABSTRACTS OF JAPAN

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(54) SYSTEM FOR RESETTING NONCONTACT IC CARD

(57)Abstract:
PURPOSE: To unnecessitate reset work after manufacturing and to stop runaway by setting the control part of an IC card at a reset state by a reset circuitand releasing the reset state by an operation signal from an MPU.
CONSTITUTION: The reset circuit 12when receiving a start-up signal from an antenna 21 on a card processor 2 sideis operated so as to be turned off for constant time. When a reset OFF state is setthe operation of a control part program in the IC card is startedand the operation signal is outputted at constant period as performing communication with the card processor 2and the reset circuit 12 prevents the control part of the IC card 1 from being set in the reset state. When the communication with the card processor 2 side is completed and an operation is completed in a normal operationno operation signal is outputtedand the reset circuit 12 sets the IC card in the reset stateand the operation of the program can be started again by the start-up signal on the card processor 2 side. When a runway state occursno operation signal is outputtedwhich stops the runaway.

## CLAIMS

[Claim(s)]
[Claim 1]In a resetting system of a noncontact IC card which has a reset circuit which operates with a seizing signal by an electric wave and light by the side of a card processorIf a reset circuit is constituted so that a control section of an IC card may usually be made into a reset statea seizing signal from the card processor side cancels a reset state and an IC card is operatedA resetting system of a noncontact

IC card preventing that output an actuating signal with a constant period in normal operationand a reset circuit makes a control section of said IC card a reset stateas for a control section of said IC card.

[Claim 2]A resetting system of the non-contact IC card according to claim 1wherein a period when said control section has prevented that a reset circuit makes this control section a reset state disregards a seizing signal from the card processor side.

[Claim 3]A resetting system of the noncontact IC card according to claim 1 or 2 canceling a reset state only when said seizing signal is more than predetermined pulse width.

## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the resetting system of the noncontact IC card which can be used for the passage check of a gateetc.
[0002]
[Description of the Prior Art]By creating a commuter pass by an IC card and turning an IC card to the ticket examining machine which distinguishes this like a commuter pass in the state where it separated several 10 cmas the automatic wicket method of a stationA ticket examining machine is a commutation rangeor it judges whether the date etc. are effectiveand if effectivea gate is openedresearch of the method of passingetc. is doneand the announcement of these data is also made.
[0003]As a correspondence procedure of such a noncontact IC card and a card processorIn the electromagnetic induction type which makes communication media the magnetic field generated by hundreds of kHz wave band radiothe microwave method which makes several gigahertz microwave communication mediaand the near infrared raythere are an optical communication type etc. which carry out communication mediaand the communication range is performed within several meters from several 10 cm. The IC card and the main part had an antennaand have transmitted and received above-mentioned communication media from this.
[0004]
[Problem(s) to be Solved by the Invention]In the noncontact IC card using such communication mediait was resetting by manual operation at the time of IC card new work. New work of a card is connecting a cell to the printed circuit board circuit of a cardand changing into the state of powering on hereand a power supply is not disconnected henceforth. In this caseit is necessary to perform initial setting after powering on. It is this initial setting's being called reset and making a stopped clock and MPU into an operating state. In the unused statea noncontact IC card stops a clock and MPU and is attaining power-saving. That isin a noncontact IC cardwhenever

it is used with a power upreset is required. By reseta program performs initialization of a register and a work region and serves as command waiting from an antenna. After new work of a cardin the state where reset is not carried outsince it is in the state which is not understood where the program is runningby this stateit will not be in the state of accepting the signal from an antenna. It comes to run by resetting from the place where a program is normal.

[0005]At the time of new workthe control section of an IC card will not be in a reset statebut the conventional noncontact IC card resets one sheet at a time by manual operation. That isif reset always works and the control section operates oncea reset circuit will commit the conventional view. It is because development will be easy and a program will also become easyif it does in this way.

[0006]That iswhen operation of an IC card's own program startsby an IC card's own judgment. That issince it can be made a reset state according to directions of a programa reset state is canceled by the seizing signal from an antennaand can perform normal operation (operation performed according to the command from an antenna)but. Since it is not a reset state immediately after manufacturing an IC card newlyit cannot operateeven if it receives the signal of reset state release from an antenna. For this reasonat the time of new design and manufacturethe IC card needed to be made into an one-sheet one-sheet reset state by manual operation. Since an IC card usually has much manufacture number of sheetsthis manual operation serves as serious work. Since the function made into a reset state by an IC card's own judgment is lost when the program of an IC card furthermore runs recklesslyThat issince a control section's own state cannot be made into a reset state at the time of the operation finish of an IC card control sectiona reckless run will not be able to be stopped but it will be in an unusable state.

[0007]Drawing 5 is a figure showing work of the control section of the IC card of the conventional reset circuit. After manufacturesince the reset circuit serves as OFF (state which cannot reset an IC card control section)if this is set to ON by manual entry operationand it makes an IC card control section into a reset state and is made to startan IC card control section will start normal operation. Since an IC card control section operates a reset circuit and makes an IC card control section a reset state when suspending normal operationthe seizing signal from the card processor side cancels the reset state of an IC card control sectionand the IC card control section can start normal operation henceforth. Since a reset circuit is operated and an IC card control section becomes impossible to a reset statea reckless run stops howeverstoppingwhen it runs recklessly.

[0008]This invention was made in view of the above-mentioned problemand does unnecessary the reset work by the manual operation at the time of manufactureand an object of this invention is to provide the resetting system of the noncontact IC card which can also stop a reckless run.

[0009]

[Means for Solving the Problem]Drawing 1 is a principle figure of this invention. In a resetting system of a noncontact IC card which has a reset circuit which operates with a seizing signal by an electric wave and light by the side of a card processorIf a reset circuit is constituted so that a control section of an IC card may usually be made into a reset statea seizing signal from the card processor side cancels a reset state and an IC card is operatedA control section of said IC card prevents that output an actuating signal with a constant period in normal operationand a reset circuit makes a control section of said IC card a reset state.

[0010]A period when said control section has prevented that a reset circuit makes this control section a reset state disregards a seizing signal from the card processor side.

[0011]A reset state is canceled only when said seizing signal is more than predetermined pulse width.

[0012]

[Function]Manufacture of an IC card constitutes the reset circuit so that the control section of an IC card may always be made into a reset state. For this reasonit is not necessary to make one sheet at a time into a reset state. If a seizing signal is received from the antenna by the side of a card processora reset circuit will be committed so that it may be considered as the fixed time OFF (state which cannot reset the control section of an IC card). It has prevented that output an actuating signal to a reset circuit with a constant periodand a reset circuit makes the control section of an IC card a reset statethe control-section programing operation of an IC card being startedand communicating the card processor side by considering it as a reset OFF state. Since an actuating signal is no longer taken out after the communication by the side of a card processor is completed and ending by normal operationa reset circuit makes the control section of an IC card a reset stateand the programing operation of the control section of an IC card is again started with the seizing signal from the card processor side. When an IC card is in a runaway statesince an actuating signal is no longer taken out from the control section of an IC carda reset circuit makes the control section of an IC card a reset stateand since it is considered as a halt conditiona reckless run stops.

[0013]The control section of an IC card outputs an actuating signal with a constant periodand while having prevented that a reset circuit makes the control section of an IC card a reset statethe seizing signal from the card processor side is disregarded. if it does not do in this way -- under reset release (an IC card -- working) It is because it will be reset by the degree which is command reception and data communications become impossiblewhen the command from a card processor resembles the seizing signal in the data communications performed.

[0014]Since the card processor side and the IC card are communicating by the electric wave etc.they tend to mix disturbance. For this reasonthe following
[ predetermined pulse width ] consider it as noiseand are kept from canceling a reset

state by this noise as a seizing signal.
[0015]
[Example]Hereafterthe example of this invention is described with reference to drawings. Drawing 2 is a block diagram showing the composition of this example. 1 is an IC card and 2 is a control device of the card processor which processes IC card 1. Although IC card 1 restores to the signal inputted from the antenna 20 of the control device 2the antenna 10 which communicatesand this antenna 10 and usually makes MPU16 the reset state with the modulation and demodulation circuit 11 which modulates the signal outputted from this antenna 10The reset circuit 12 which operates so that MPU16 may not be made into a reset statewhen there are a seizing signal from the control device 2 and an actuating signal from MPU16 mentioned laterThe serial/parallel-conversion machine 13 which changes the serial data to input into parallel dataand changes the parallel data to output into serial dataIt comprises ROM14 and RAM15 which store a program and dataMPU16 execute a program based on an input signal and the result is made to output from the antenna 10the clock 17 which supplies timing in IC card 1and the cell 18 which supplies electric power.
[0016]Drawing 3 is a circuit diagram of the reset circuit 12. Drawing 4 is a timing chart of the reset circuit 12. With reference to both figuresoperation of the reset circuit 12 is explained below. The reset circuit 12 is controlled by the seizing signal which received the data from the antenna 20 and to which it restoredand the actuating signal which MPU16 outputs with a working constant period.
[0017]When IC card 1 is in a reset state (state produced by the usual operation of the reset circuit 12)A break signal fulfills AND conditions from the modulation and demodulation circuit 11and "** working control" signal will be in a LOW state by the OR condition and NAND conditions for it to be more than the pulse width decided by T2=R2 and C2. Since *STBY serves as HIGH simultaneouslythe oscillation operation of MPU16 is started. Reset is canceled after the time of T1=R1 and C1 where this oscillation operation is stabilizedand operation of a program is attained. If a 1-time "** working control" signal serves as LOWin order to forbid reset by the signal from the antenna 20this LOW signal is put into the break signal to input as AND conditions via the inverter 126127and it is considered as "prohibition on ** reset."
[0018]If reset is canceledMPU16 will output a trigger of operation to OR gate 124 with a constant period (less than T1)and will maintain "** working control" signal at a LOW state. If MPU16 stops and ** operation trigger is no longer outputtedT4=R4 and 4 hours after C** working controlsignal will serve as HIGHand will be in a reset state. Therebyif MPU16 stopsMPU16 will certainly be in a reset state. Since MPU16 will be in a reset state even if a program runs recklessly and MPU16 stops outputting ** operation triggerit stops and a reckless run serves as seizing signal waiting from the card processor 2.
[0019]Nextwork of each formation part of a circuit is explained. When the filter circuit which comprises R2 and C2 has the pulse width of the seizing signal from the antenna

20 smaller than the damping time constant of T2=R2 and C2it considers that it is a noise and removes. The circuit which comprises R4 and C4 decides on time for "✱✱ working control" signal of drawing 4 to serve as HIGH with the damping time constant of T4=R4 and C4. T4 is decided by the control action of an IC card. If shortit becomes a burden of a programand if too longthe time to a reboot will become long.
[0020]The circuit which comprises R1C1and D (diode) delays the time of the reset release to MPU16 with the damping time constant of T1=R1 and C1. This time performs oscillation and stabilization of a clock. The diode D changes MPU16 promptly into the state of the waiting for startingand also when the following seizing signal comessufficient clock oscillation time is taken.
[0021]The reset action by the manual operation at the time of guard manufacture not only becomes unnecessarybut in the case of this deviceit becomes unnecessary [ the reset action by the manual operation at the time of a changing battery ]. When the ambient air temperature of an IC card fallscell voltage falls and the data of a memory may be destroyed. If temperature rises in this state and a program is operatedit may run recklesslybut a reset function can work and can make it stop also to this reckless run.
[0022]
[Effect of the Invention]In this inventionthe reset circuit is usually made to make the control section of an IC card a reset stateand the seizing signal and the actuating signal from MPU canceled reset so that clearly from the above explanation. Thereforethere is no necessity for the reset action by the hand control after manufactureand even if a reckless run occursthe control section of an IC card can be made into a reset stateand can be stopped.

## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a principle figure of this invention.
[Drawing 2]It is a figure showing the composition of the example of this invention.
[Drawing 3]It is a reset circuit diagram.
[Drawing 4]It is a timing chart of this example.
[Drawing 5]It is a figure showing operation of a conventional example.
[Description of Notations]
1 IC card
2 Card processor
10 and 20 Antenna
11 Modulation and demodulation circuit
12 Reset circuit

13 Serial/parallel-conversion machine
14 ROM
15 RAM
16 MPU
17 Clock
18 Cell